

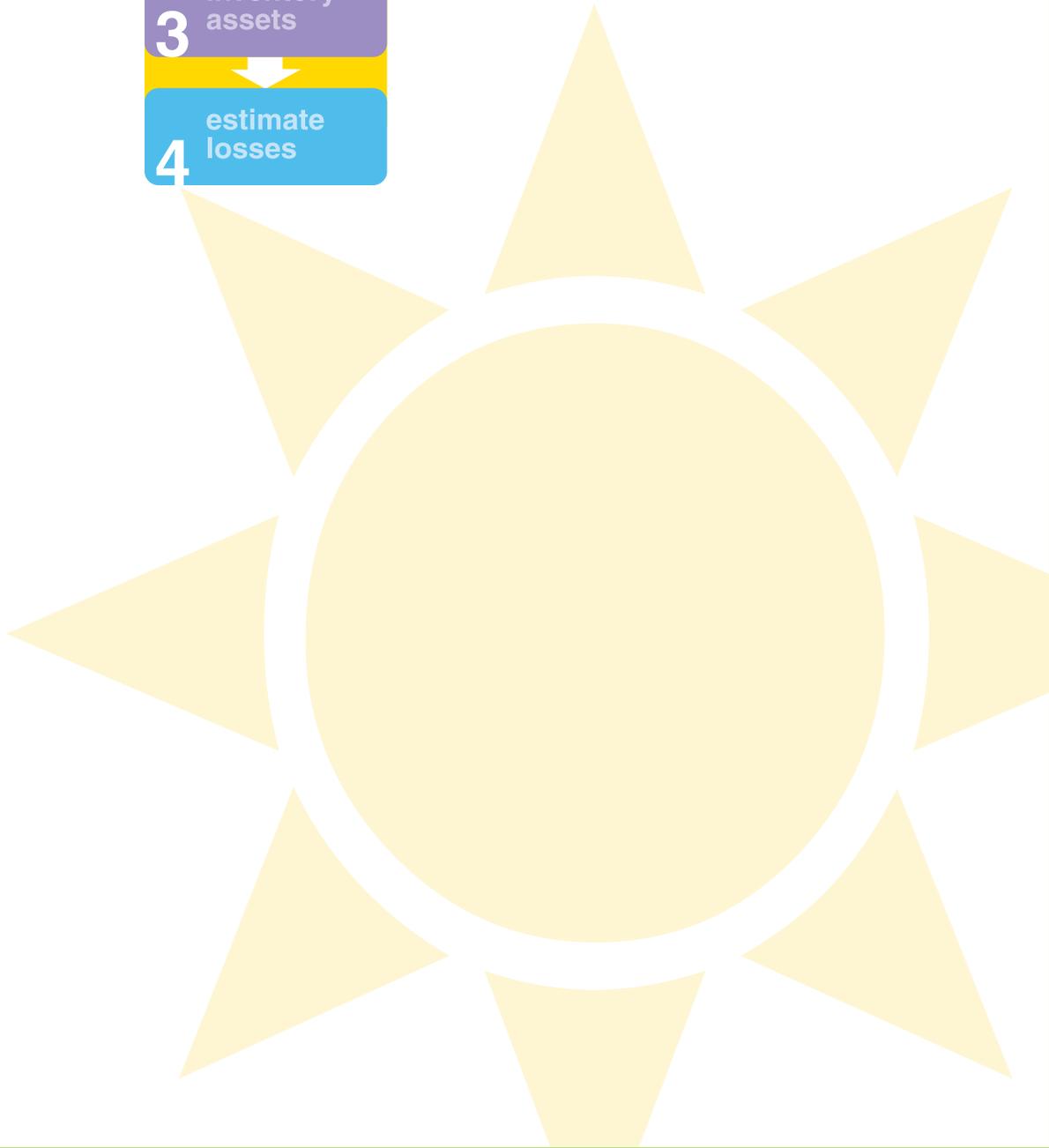
step

1 identify hazards

2 profile hazard events

3 inventory assets

4 estimate losses



identify hazards

Overview

The first step in doing a risk assessment answers the question:
What kinds of natural hazards can affect your planning area?

In this step, you will simply identify all the natural hazards that *might* affect your community or state and then narrow your list to the hazards that are most likely to impact you.

Bear in mind that although a hazard may not have affected you recently, it doesn't mean it won't in the future. You should look at the full range of potential hazards and assess whether they may affect the area you're including in your mitigation plan. While this might sound daunting, there is a relatively small list of hazards to consider.

Remember that all subsequent steps in the **Natural Hazard Mitigation Planning Process** are built on the information gathered during risk assessment. As you proceed, remember to keep records of what you've found and where you've found it. Your records may include copies of documents or maps, notes on whom you talked to and when you talked to them, Website references, and so forth. You'll need these later in the loss estimations and in the rest of the mitigation planning processes. Use **Worksheet #1: Identify the Hazards** in Appendix C (see example on page 1-2) to keep track of your research, and when you're finished with this step, you'll have a list of hazards that could affect your community or state.



St. Louis tornado damage, May 27, 1896.



Remember, for now you are simply compiling information about what hazards affect your state or community, but later you will be assessing the risks they pose. It's a good idea to read through the whole guide before starting to gather information, so you can get everything you need from the various sources and not have to return later for additional data.

essing the risks they pose. It's a good idea to read through the whole guide before starting to gather information, so you can get everything you need from the various sources and not have to return later for additional data.

Procedures & Techniques

Task A. List the hazards that may occur.

There is no one source for identifying which hazards may affect your state or community. However, the following techniques are methods that have worked for others and should at least provide you with a good starting point.

1. Research newspapers and other historical records.

These records will often contain dates, magnitudes of the events, damages, and further evidence of past natural disasters in your

Date: **March, 2001**

What kinds of natural hazards can affect you?

Task A. List the hazards that may occur.

1. Research newspapers and other historical records.
2. Review existing plans and reports.
3. Talk to the experts in your community, state, or region.
4. Gather information on Internet Websites.
5. Next to the hazard list below, put a check mark in the Task A boxes beside all hazards that may occur in your community or state.

Task B. Focus on the most prevalent hazards in your community or state.

1. Go to hazard Websites.
2. Locate your community or state on the Website map.
3. Determine whether you are in a high-risk area. Get more localized information if necessary.
4. Next to the hazard list below, put a check mark in the Task B boxes beside all hazards that pose a significant threat.

- | | Task A | Task B |
|------------------------|-------------------------------------|-------------------------------------|
| Avalanche | <input type="checkbox"/> | <input type="checkbox"/> |
| Coastal Erosion | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Coastal Storm | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Dam Failure | <input type="checkbox"/> | <input type="checkbox"/> |
| Drought | <input type="checkbox"/> | <input type="checkbox"/> |
| Earthquake | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Expansive Soils | <input type="checkbox"/> | <input type="checkbox"/> |
| Extreme Heat | <input type="checkbox"/> | <input type="checkbox"/> |
| Flood | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Hailstorm | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Hurricane | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Land Subsidence | <input type="checkbox"/> | <input type="checkbox"/> |
| Landslide | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Severe Winter Storm | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Tornado | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Tsunami | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Volcano | <input type="checkbox"/> | <input type="checkbox"/> |
| Wildfire | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Windstorm | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> |

Use this space to record information you find for each of the hazards you will be researching. Attach additional pages as necessary.

Hazard or Event Description (type of hazard, date of event, number of injuries, cost and types of damage, etc.)	Source of Information	Map Available for this Hazard?	Scale of Map
Flood - June 1936. 500-year flood. One death, some corn & crop losses.	<ul style="list-style-type: none"> •Members of community •Newspaper •Floodplain manager 	FIRM	1: 6000
Hurricane Camille - Nov. 1969. One death. Flooding & wind caused \$1.5 million in damages.	<ul style="list-style-type: none"> •Newspaper •Internet research 	FIRM & storm surge map	1: 6000 1: 6000
Severe storm caused flooding & landslides - May 1973. \$2 million in damages.	<ul style="list-style-type: none"> •Newspaper •State geologist 	Topographic & soils maps	1: 24000
Severe storm & tornadoes - April 1980. Wind & flash floods caused \$1.5 million in damages.	<ul style="list-style-type: none"> •Newspaper 	No	
Wildfires - April 1981. 1,050 acres burned.	<ul style="list-style-type: none"> •Newspaper •State fire marshal 	Topographic USDA & fuel model maps.	1: 24000

Note: **Bolded** hazards are addressed in this How-To Guide.

community or state. A public library may also have documentation on these events in the "local history" section. Local historical societies may also be good sources of information.

2. Review existing plans and reports.

The preceding techniques are focused on local sources of information that will likely provide a good start to the process. However, to ensure you are covering all of the possible hazards, you will want to broaden the contacts you make. There are many types of plans and documents that may have information on natural hazards in your community or state. Many states will already have mitigation plans, hazard identification reports, and/or risk assessment reports. State transportation, environmental, dam, or public works reports or plans may also contain relevant information. Although these may not contain a lot of details about local hazard conditions, they offer a good starting point for communities, and using them improves consistency among communities within the state. Review the plans for a list of hazards that can occur in the state or for a list of disasters that have occurred in the past.

Local comprehensive plans, land use plans, capital improvement plans, as well as building codes, land development regulations, and flood ordinances may contain hazard provisions that indicate the presence of local hazards. You should review these to determine whether a local hazard exists.

3. Talk to the experts in your community, state, or region.

There are many sources of hazard information in government, academia, and the private sector. Many local floodplain managers, departments of public works, engineering, planning and zoning, and transportation departments maintain information about natural hazards. Those who would have been involved with past natural hazard events such as the police and fire departments or the local emergency management staff are also excellent sources of information on past hazard events. Furthermore, state agencies, including water or natural resources, geological survey, and emergency management will have detailed knowledge about the nature and extent of hazards in your state. University departments, including planning, landscape architecture, geography, and engineering may already have hazard maps or can help you obtain them. Many local businesses that provide hazard related services might be willing to assist you.

Your best source of hazard information will often be your state. The State Hazard Mitigation Officer (SHMO) will know what hazards affect your state, and is also a good source for suggestions



The information you discover in the newspapers and on the Internet will help you when you talk to hazard experts in your community. It will provide you with technical terms and general factual information about the various hazards, in addition to helping you identify the appropriate experts to contact.



State emergency management departments are sometimes housed in larger agencies such as state police, military, or public safety.

Research past Presidentially declared disasters, as well as non-declared severe events that have occurred in your state and in other states within your region. You should inquire into the types of hazards that have occurred in the adjoining states as well. Communicate this information to your communities.



Search database or computerized archives with the following list of hazards as keywords. Narrow the search by using the name of your community, state, or surrounding states as keywords (the following list not meant to cover all known natural hazards).



- Avalanche
- Coastal Erosion
- Coastal Storm
- Dam Failure
- Debris Flow
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flood
- Hailstorm
- Hurricane
- Land Subsidence
- Landslide
- Severe Winter Storm
- Tornado
- Tsunami
- Volcano
- Wildfire
- Windstorm

about where to go for more detailed information. Bear in mind that the SHMO may not have specific information about the hazards that affect a particular community but will probably be knowledgeable about your area of the state and will often be able to suggest other people to talk to or additional resources.

4. Gather information on Internet Websites.

The library at the end of this guide lists many such sites. These may be hazard-specific sites that provide general information about why particular hazard events happen, what the probabilities of occurrence are, and how hazards are measured. Other Websites will have state-specific, or even site-specific information about the hazards in a particular area and about the characteristics of the hazards, such as the probability, history of events, and expected severity.

Task B. Focus on the most prevalent hazards in your community or state.

If your preliminary research reveals that your community or state has been affected by a particular hazard or that experts consider your area to be threatened by that hazard, you will concentrate further research on it in later steps.

If your planning area has not experienced a hazard event in recent memory but one of the sources indicates it is a possibility, it may be worth a little extra effort to confirm that a particular hazard type is relevant.

1. Go to the indicated Websites for the seven major hazards to help you determine whether your community or state can be affected by the hazard.
2. Locate the approximate location of your community or state on the Website map.
3. Examine the map to determine whether you are located in a high-risk area for that hazard and to determine the chance it will occur in your planning area. You may need to get more localized information for some of the hazards.
4. You may find that you can delete some hazards from your list at this time; however, if you are unsure or uncomfortable with the chance of the hazard occurring, it's better to keep all potential hazards on the list, until you are certain that it is appropriate to remove it.

The Hazardville Post

Vol. CXI No. 100

Thursday, April 10, 2001

The Organization for Risk Reduction Seeks Danger

(Part 1 of a 4 Part Series on the Risk Assessment Process)

[Hazardville, EM] The Town of Hazardville Organization for Risk Reduction (THORR) is on a mission to find out about the natural hazards that threaten Hazardville. The task force, appointed by Mayor McDonald, will develop a hazard mitigation strategy to reduce the town's vulnerability to natural hazards such as floods, hurricanes, and earthquakes. While the process of researching the town's potential hazards is not exactly fraught with danger, "the task force is using a lot of different resources to discover the past and possibly future impacts from hazards," said Joe Norris, the task force lead planner.

THORR began researching past impacts from hazards simply by talking to people in the community. "You'd be surprised just how much information people know and remember about the disasters from years ago," said Norris. "We visited an elderly man who lives near Raging River who vividly recalled the Flood of 1936. While there was not much of a human toll because the Raging River area was largely rural, agricultural, and forested at the time, this man recalled that the fast-moving waters were apparently quite deep." Norris noted that a search of local newspaper archives confirmed the flood, as did a conversation with the Floodplain Manager. "She said that the flood was estimated to be a 500-year event - something that has only a 0.2% chance of happening annually."

Another resource the task force has tapped is the State Hazard Mitigation Officer (SHMO). The SHMO provided THORR with a copy of the state haz-

ard mitigation plan, which discussed past disasters that have occurred in the State of Emergency. THORR has found the document to be useful in describing the likelihood that certain hazard events will occur in Emergency. An even more valuable resource provided by the SHMO has been contact with various hazard experts in state government. "They're free!" laughed Norris, alluding to a concern expressed by the Town Council that a risk assessment may be an expensive endeavor.

Norris remarked that THORR has found the State Geologist to be especially helpful in furnishing information on earthquakes and landslides. According to the State Geologist, Hazardville sits squarely in the middle of an earthquake zone, about 100 miles from the New Temptfate fault. "I know we've experienced a few tremors over the years, even some collapsed chimneys from one of the stronger tremors, but I had no idea the potential for stronger earth-

DATE	TYPE OF INCIDENT
November 7, 1969*	Hurricane Camille
April 9, 1970	Heavy Rain, Tornadoes, Flooding
March 27, 1973	Earthquake Tremors (offshore)
May 29, 1973*	Severe Storms, Landslides, Flooding
October 2, 1975	Severe Storms, Tornadoes, Flooding
April 9, 1977*	Landslides, Flooding
March-October, 1977	Drought
March 17, 1979*	Wildfire
April 18, 1979*	Storms, Wind, Flooding
April 20, 1980*	Severe Storms, Tornadoes, Flooding
April 10, 1981*	Wildfire
May 11, 1984	Earthquake Tremors
September 7, 1985*	Hurricane Elena
March 21, 1990	Severe Storms, Tornadoes, Flooding
January 4, 1991	Severe Storms. Flooding
March 3, 1994*	Severe Winter Storms, Freezing, Flooding
July 8, 1994*	Offshore Earthquake, Tsunami
April 21, 1995	Severe Storms, Landslides, Flooding
March 20, 1996*	Severe Storms, Landslides, Flooding
April 29, 1998*	Flooding (Tropical Storm Zoe)
September 15, 1999*	Wildfire
November 10, 1999	Earthquake, Aftershocks

* State or Presidentially declared disaster

quakes existed in Hazardville."

Through its research, THORR has uncovered information on many large and small hazard events. In fact, on 13 occasions from 1969 to 1999, these events have met the criteria to be state or federally declared disasters. The list of events THORR has researched appears above.

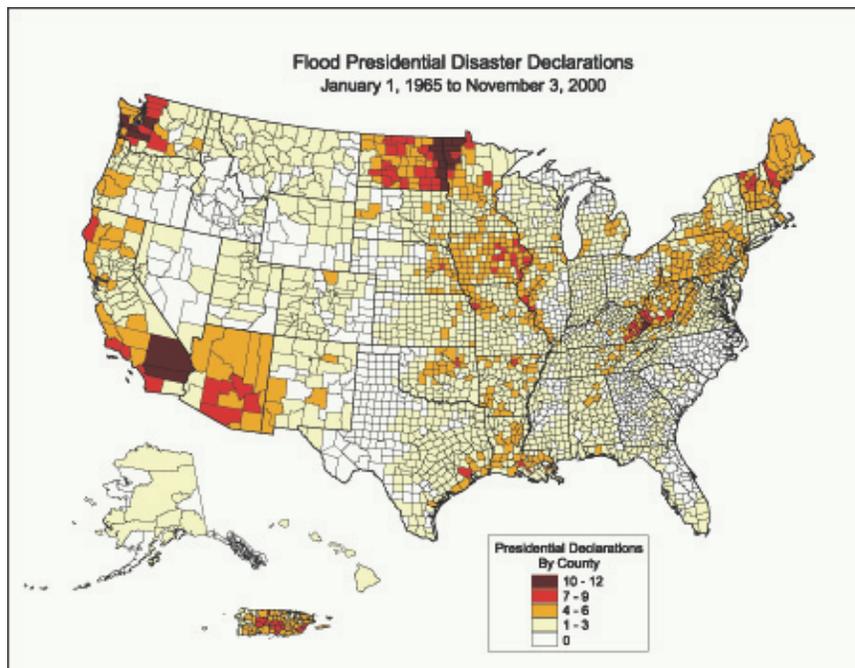
When asked what the next steps are for THORR, Norris responded, "THORR will continue to research these hazards. The more information we have, the better our risk assessment will be."

Floods

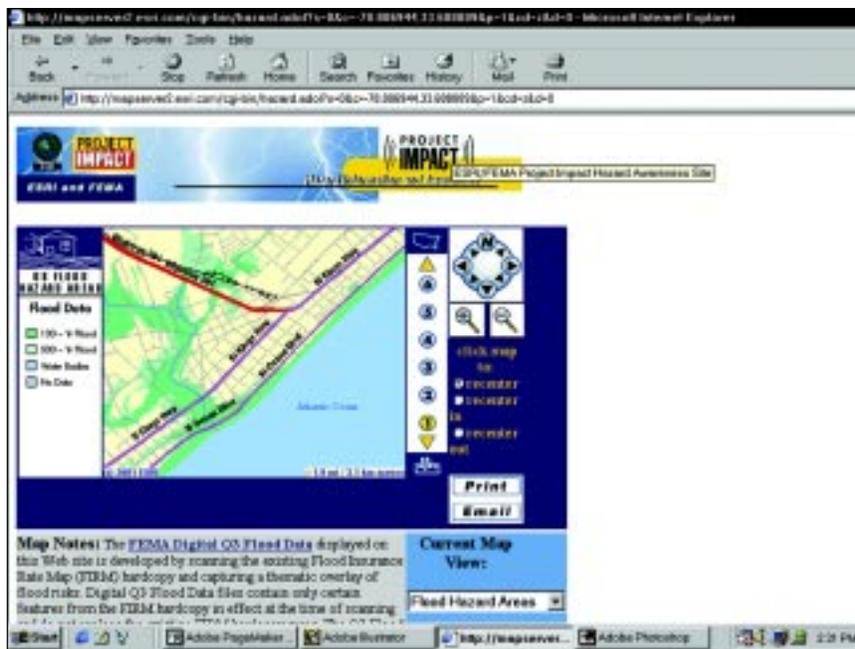
Floods are the most prevalent hazard in the United States. This map illustrates where there have been past Presidential declarations for flood events. FEMA has prepared Flood Insurance Studies (FIS) for floodprone communities. These FISs contain information on local flood history, local flood problems, and other flood studies that have been prepared for the community.

FEMA has also created Flood Insurance Rate Maps (FIRM) for more than 19,000 communities in the country as a part of the FIS. In addition to the 100-year floodplain, which is the area of the community with a 1% chance of flooding in any given year, the FIRM also illustrates coastal high hazard areas, the floodway, and the 500-year floodplain, which is the area of the community with a 0.2% chance of flooding in any given year.

Digital Quality Level 3 flood data (Q3) are available for 1,200 counties in CD-ROM format from FEMA. A list of counties is available at <http://msc.fema.gov/MSC/statemap.htm>. The digital Q3 flood data are a digital representation of certain features on FIRMs and can also be viewed in HAZUS.



Source: FEMA

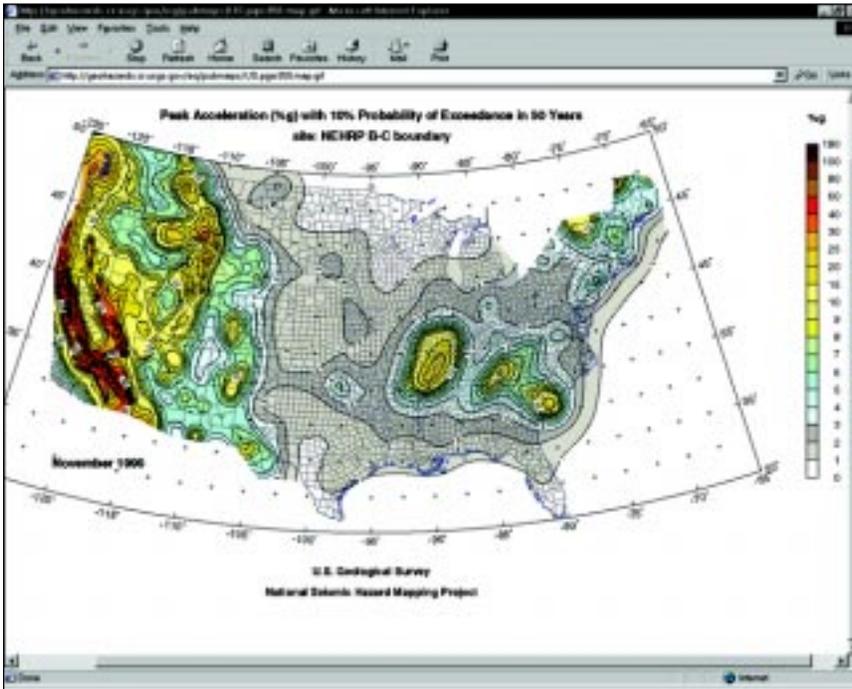


Source: <http://www.esri.com/hazards/>

1 Review your FIRM or Q3 to identify areas prone to flooding. Alternatively, go to www.esri.com/hazards to conduct a preliminary identification of flood hazards using digital Q3 flood data available online.

2 Go to Step 2 for information on acquiring flood maps and on profiling your flood hazard.

Earthquakes



Source: <http://geohazards.cr.usgs.gov/eq/pubmaps/US.pga.050.map.gif>

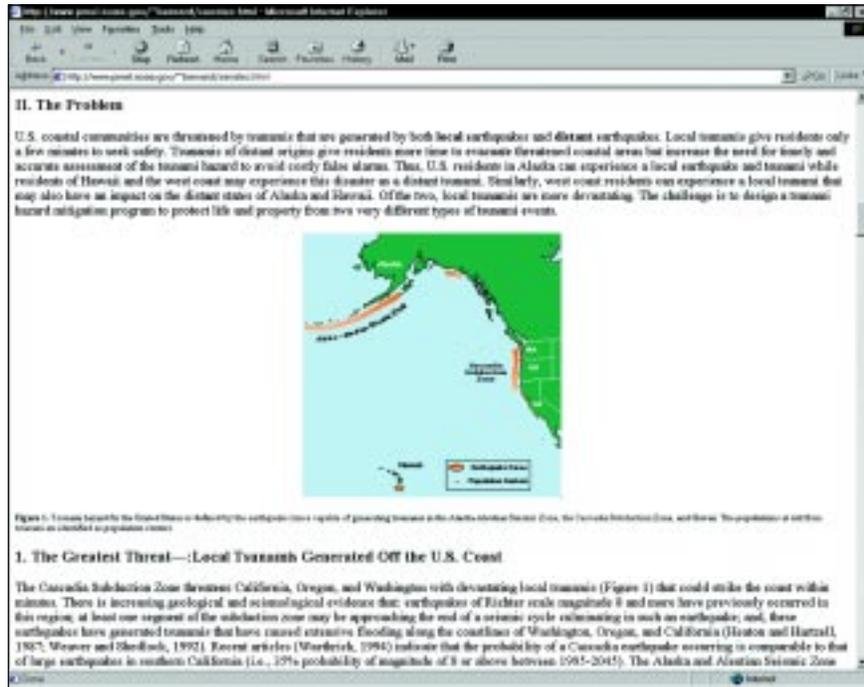
- 1** Go to the <http://geohazards.cr.usgs.gov/eq/pubmaps/US.pga.050.map.gif> Website to determine whether you are located in an earthquake hazard zone.
- 2** Find the approximate location of your community or state on the seismic hazard map.
- 3** If you are located in an area with 2%g (peak acceleration) or less, then you have a relatively low seismic risk and can probably avoid conducting an earthquake risk assessment at this time. However, you should confirm your findings with your state geologist or emergency manager.
- 4** If you are located in an area with 3% g peak acceleration or more, then you should proceed to Step 2 to profile your earthquake hazard.





Tsunamis

- 1 Go to the <http://www.pmel.noaa.gov/~bernard/senatec.html> Website. This page will show population centers on the West Coast of the United States that are at risk of tsunamis.
- 2 Find the approximate location of your community or state on the tsunami map.
- 3 If you are not located on the West Coast, a Pacific Island, or a Caribbean Island*, then you have a relatively low tsunami risk and can probably avoid conducting a tsunami risk assessment at this time. However, you should confirm your findings with your state geologist or emergency manager.
- 4 If you are located in communities along the shoreline, along coastal estuaries, or along rivers affected by tides in Alaska, Washington, Oregon, California, Hawaii, or Puerto Rico, then you should proceed to Step 2 to profile your tsunami hazard.



Source: <http://www.pmel.noaa.gov/~bernard/senatec.html>

***NOTE:**

Recent findings indicate that tsunamis are also possible along the Atlantic Ocean coastal areas of Virginia and North Carolina. As more information become available, these areas may also wish to include tsunamis in their risk assessment.

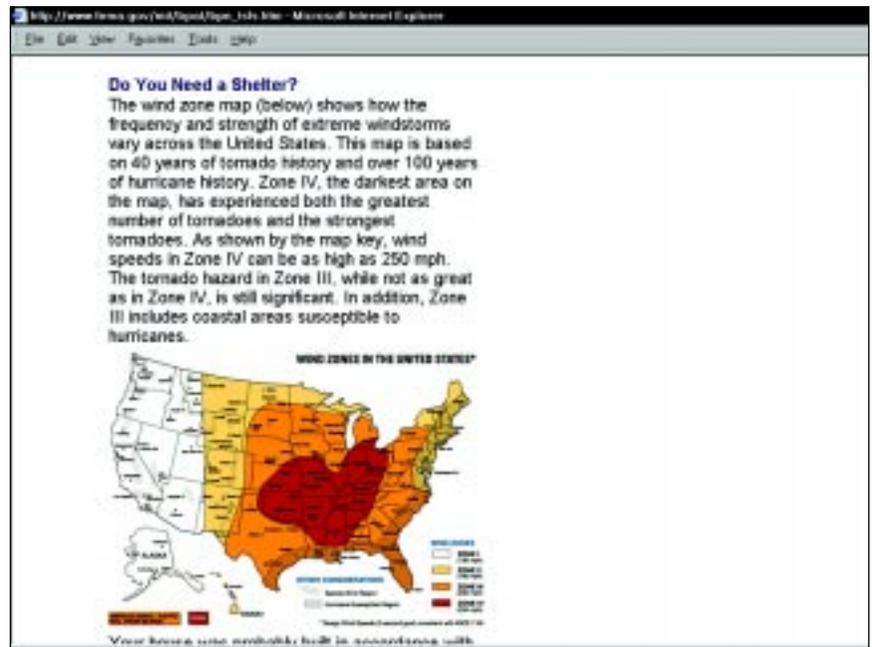


Tornadoes

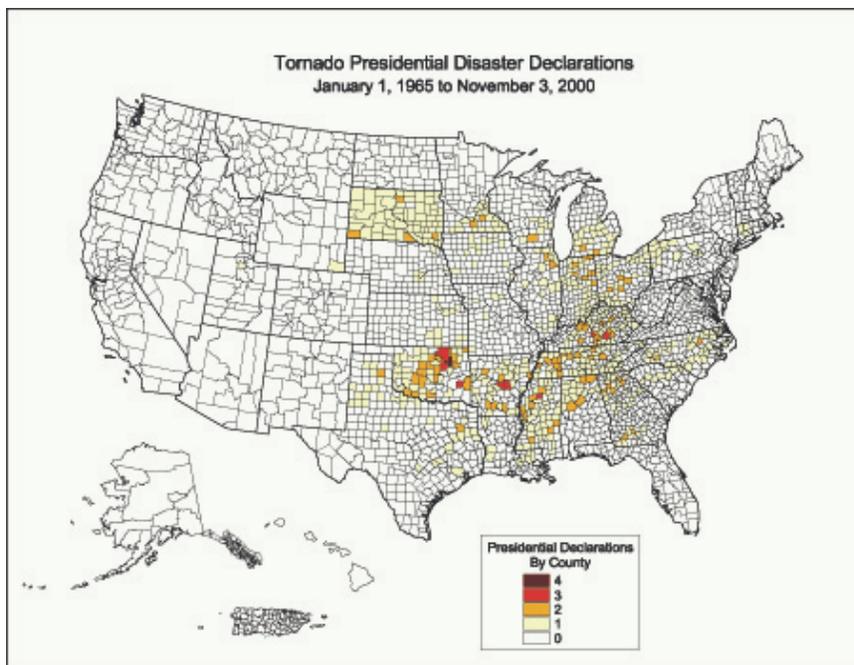


1 Go to the http://www.fema.gov/mit/bpat/bpn_tsfs.htm Website. This page shows the wind zones throughout the United States. These wind zones are based on historical information on tornadoes and hurricanes. The map below illustrates areas where Presidential declarations have been issued for tornadoes in the past.

2 Locate your community or state on the US Wind Zone map.



Source: http://www.fema.gov/mit/bpat/bpn_tsfs.htm



Source: FEMA

3 If you are not located in one of the four colored zones or special wind regions on the map above, you can probably avoid conducting a tornado risk assessment at this time. However, you should confirm your findings with your state meteorologist or emergency manager.

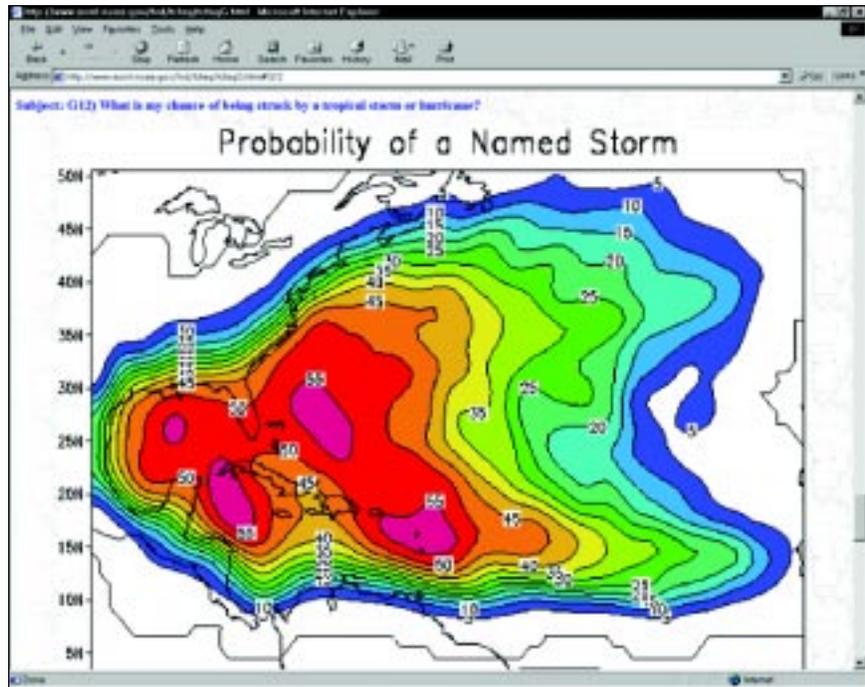
4 If you are located in one of the four colored zones or special wind regions on the map above, then you should proceed to Step 2 to profile your tornado hazard.



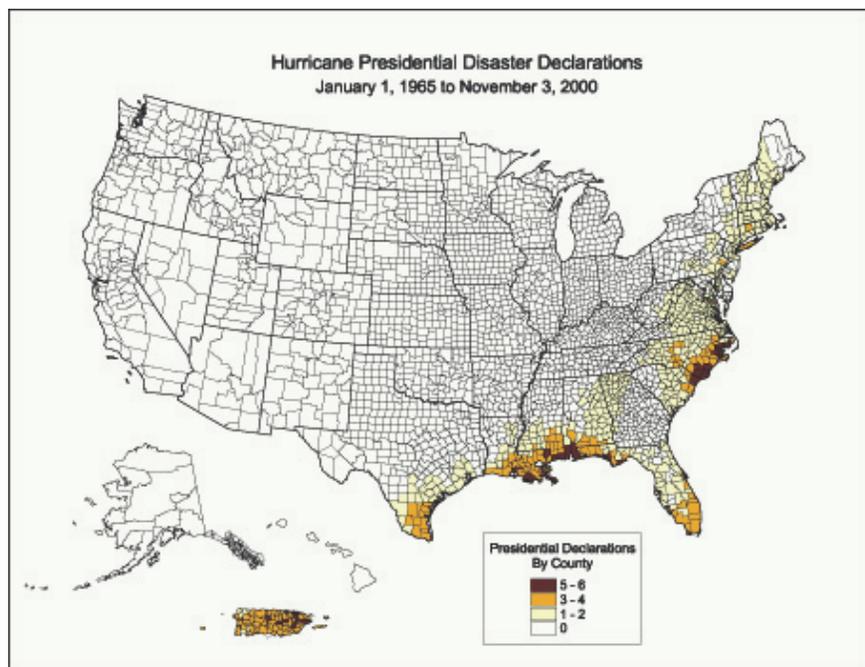


Coastal Storms

- 1 Go to the <http://www.aoml.noaa.gov/hrd/tcfaq/tcfaqG.html#G12> Website. This page illustrates the probabilities of a named storm for the Atlantic Seaboard and the Gulf of Mexico. The map below illustrates where Presidential declarations have been issued for past hurricanes.
- 2 Locate your community or state on the coastal storm probability map.
- 3 If you are not located in a coastal storm probability zone you can probably avoid conducting a coastal storm risk assessment at this time. However, you should confirm your findings with your state coastal zone manager or floodplain manager.
- 4 If you are located in a coastal storm probability zone, then you should proceed to Step 2 to profile your coastal storm hazard.

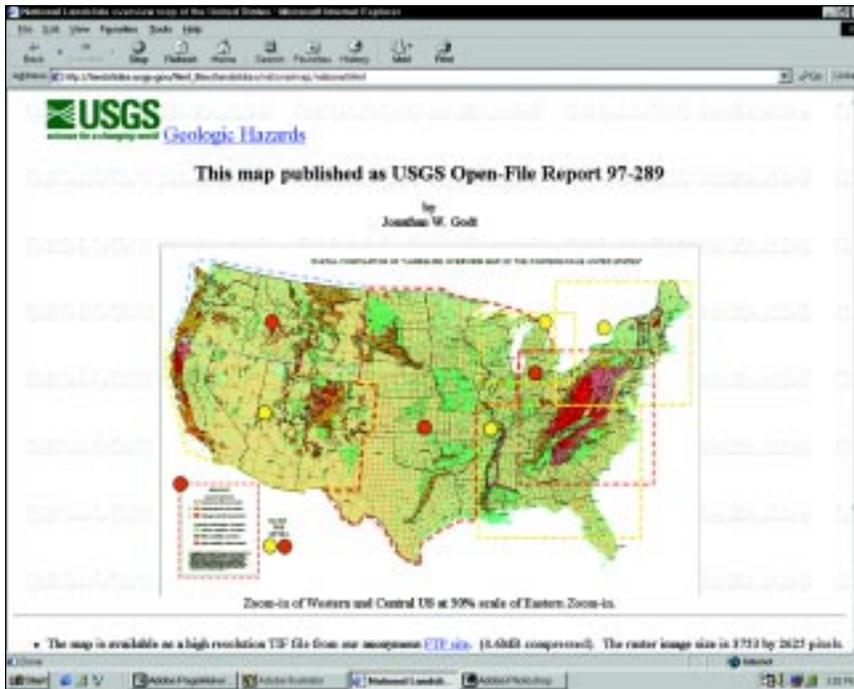


Source: <http://www.aoml.noaa.gov/hrd/tcfaq/tcfaqG.html#G12>



Source: FEMA

Landslides



Source: http://landslides.usgs.gov/html_files/landslides/nationalmap/national.html

- 1** Go to the http://landslides.usgs.gov/html_files/landslides/nationalmap/national.html Website. This page illustrates large-scale landslide risk areas.
- 2** Locate your community or state on the landslide hazard map. The Website listed above allows you to zoom in to different regions for a closer look at the landslide risk. While this map gives a broad indication of large-scale risk at a national scale, it is important to know that landslides should be evaluated at a local scale. The map shown above is not suitable for small-scale, community-level hazard identification.
- 3** You should discuss landslide potential with your state geologist, who can be found at <http://www.kgs.ukans.edu/AASG>, and with your local public works director.
- 4** If either your state geologist or local public works director indicates a landslide risk in your community or state, you should proceed to Step 2.





Wildfires

1 Go to the http://www.fs.fed.us/land/wfas/fd_class.gif Website. This page illustrates the current fire danger conditions and changes daily based on current and past weather, fuel types, and fuel moisture. The map below illustrates where Presidential declarations have been issued for forest fires in the past.

2 Locate your community or state on the fire danger map.

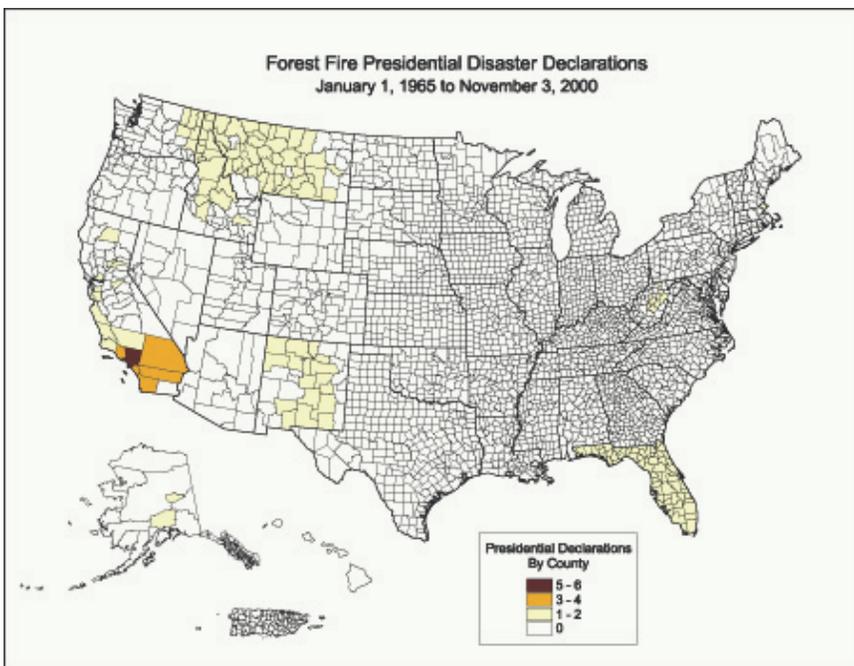
3 If you are located in or near a low to moderate fire danger class and not located near forest, grasslands, or

dense wooded areas then you have a relatively low wildfire risk and probably can avoid conducting a wildfire risk assessment at this time. However, you should confirm your findings with your state fire marshal, forestry department, natural resources department or park service.



Source: http://www.fs.fed.us/land/wfas/fd_class.gif

4 If you are located in or near a dense woodland, forest or grassland area, or have a high to extreme fire danger class, have experienced a prolonged dry period, or have experienced past wildfires, you should proceed to Step 2 to profile your wildfire hazard.



Source: FEMA



Summary

When you're finished with Step 1, you'll have a list of hazards that could affect your community or state. At this point, it isn't necessary to know anything specific about the hazards except that they are likely to occur.

You will also have a list of plans, reports, Websites, articles, and other resources that can help you later in the process as you determine how these hazards can affect your community.

Through your research, you will begin to foster relationships with experts in the state and local community. This network will continue to be of use to the Planning Team as you continue to analyze the effects of the hazards, and throughout the planning process.



Keep your research handy

because after your risk assessment is complete, you will use this information

to help complete your hazard mitigation plan as part of the third phase in the Natural Hazard Mitigation Planning Process.

After you have identified all of your hazards and determined which hazards are most prevalent in your community or state

Go to Step 2

to use the information you have gathered to develop hazard profiles.

